Oregon Space Grant Consortium
Oregon State University
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PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The **Oregon** Consortium is a Program Grant Consortium funded at a level of **$660,000** for fiscal year 2010.

PROGRAM GOALS

The Oregon Space Grant Consortium (OSGC) focuses on interdisciplinary and inter-institutional collaborations among the OSGC member institutions to strengthen the statewide STEM-based educational infrastructure and increase science literacy for Oregon students with an emphasis on authentic, hands-on student/mentor projects. OSGC relies on the strength of its community college, university, and informal education partners to provide a diverse pool of students, educators, researchers, and administrators to sustain a Consortium that continually and effectively contributes to the National Space Grant Program.

Oregon Space Grant's Diversity Plan goals include the following: 1) Maintain diverse Consortium management, members, and projects; 2) Award undergraduate scholarships to underrepresented minorities congruent with the state demographics of 12.9%; 3) Increase female participation in the scholarship program applicant pool by 5% from FY09.

Scholarship/Fellowship Program goals include: 1) Administer the OSGC scholarship/fellowship call and payment processing of the awards; 2) Competitively make 14 awards for the Undergraduate Scholarship Awards Program congruent with the state demographics of 12.9% of underrepresented minorities in the STEM disciplines; 3) Maintain 6 graduate fellowship awards; 3) Increase female participation in the FY10-11 Scholarships Program applicant pool by 5%.

Research Infrastructure goals: 1) Administer the OSGC Affiliated Faculty Research Award Program call and award at least 4 faculty research grants with an emphasis on hands-on authentic science inquiry with at least one awarded to a female and/or underrepresented minority; 2) Host the annual OSGC Student Symposium to highlight OSGC-supported student research projects.

Higher Education goals: 1) Provide support for 5 pre-service educators who are working towards STEM teaching certification at an OSGC affiliate institution; 2) Award up to one university team participating in the NASA Reduced Gravity Student Flights Opportunity Program; 3) Make one team award in support of the OSGC LaunchOregon Balloon Satellite Program or Rocket Program; 4) Award one STEM Course Development Award to an OSGC affiliate faculty to encourage development of interdisciplinary courses designed around NASA research areas of interest as defined by the Mission Directorates; 5) Provide web hosting and promotion of Volcano World, an online volcano information resource for students and educators; 6) Disseminate information and provide financial support for NASA center internship and academy opportunities with at least one award provided to a female or underrepresented minority student.

Pre-College Program goals: 1) Disseminate information for teacher professional development opportunities that incorporate hands-on, science inquiry and award at least one opportunity to an in-service STEM educator; 2) Provide travel funds for an OSGC faculty member to attend the Western Regional Space Grant Meeting in Omaha, NE in September 2010 to present Global Climate Change workshop information.

Public Outreach Program goal: 1) Disseminate NASA material, resources, and professional development opportunities via the OSGC website and online educator blog.

Consortium Management FY2010 goals: 1) Host the OSGC Annual Affiliate Meeting at The Museum at Warm Springs in Warm Springs, OR in September 2010; 2) Nominate and vote for two-year appointment of the OSGC Associate Director; 3) Attend the Western Regional Meeting and Spring National Council of Space Grant Directors Meeting; 4) Disseminate information and opportunities from NASA Headquarters and the National Space Grant Program network directly to affiliate representatives; 5) Maintain the OSGC website with current OSGC and NASA program information, research and education opportunity announcements, resources for students and educators, and other general OSGC and NASA news and updates; 6) Make annual affiliate site visits as permitted; 7) Complete NASA contract reporting in a timely manner; 8) Provide contact information for OSGC student awardees for the longitudinal tracking program.

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Student comments gathered through longitudinal tracking are below:

This opportunity allowed me to apply what I learned in the classroom to a real-life application. I was fortunate to work with high caliber staff, some who took on the role of mentor. My experiences benefit me professionally and personally in positive ways. My career goals lie in education. This project allowed me to learn more about how learning

takes place in an Aviation and a Space museum. It encouraged me to think about how to design spaces where the general public can effectively learn about aerospace. I am currently working toward a Ph.D. in informal science education. I hope to return to a facility that focuses on aerospace one day in the future and apply my skills to create great learning experiences for all visitors. (Michele Crowl - on 08/25/10, 2010 Evergreen Industry Internship) This opportunity contributed to Outcome 1 and 3 by developing STEM workforce through hands-on experience and by building partnerships between STEM formal and informal education via a collaborative project.

My participation with the Space Grant program has had a profound impact on my education and life. Upon completing my undergraduate degree I was interviewing frequently with high tech companies, and one common question that all these potential employers was, 'What kind of work did you do at NASA?' I'm still in frequent contact with many of my friends back at KSC's MILA Space Tracking Station on both a personal and professional level, and I will always be able to look back at that summer working on the Shuttle Team fondly. Additionally, in the Winter of 2009 I was awarded the undergraduate research scholarship where I designed, developed, and implemented a single-axis solar tracker. The scholarship award helped to offset my cost into the project, and was presented at the OIT Senior Project Symposium and the Oregon NASA Space Grant Meeting. These presentations were well received by not only members of academia but also industry leaders from Intel, Tektronics, TriQuint, OMSI etc. (Bryant Baker, 2008 Undergraduate Scholarship-Portland Community College - Sylvania Campus, 2009 Undergraduate Scholarship-Oregon Institute of Technology, 2010 Undergraduate Research Scholarship-Oregon Institute of Technology) This opportunity is linked to Outcome 1 and 2 by contributing directly to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals and by offering a student a progression of educational opportunities in the STEM disciplines.

PROGRAM ACCOMPLISHMENTS

Diversity Plan: 1) Maintained diverse Consortium management, members, and projects; 2) Awarded 20% undergraduate scholarships to underrepresented minorities in excess of the state demographics of 12.9%; 3) Exceeded the 5% increase of the female participation in the scholarship program applicant pool from 26% in FY09 to 50% in FY10.

Scholarship/Fellowship Program: 1) Awarded 15 scholarships, ranging from $3,000 to $5,000 per student depending on scholarship program; 2) Increased number of awards to underrepresented minorities to 20%, in excess of the state demographics of 12.9%; 3) Funded 6 graduate fellowships; 4) Increased the female applicant pool to 50% from 26% in FY09. Scholarship/Fellowship accomplishments relate to NASA's Education Priorities and current areas of emphasis by utilizing authentic, hands-on student experiences in STEM disciplines. (Outcome 1)

Research Infrastructure: 1) Awarded the following 4 Faculty Research Awards with emphasis on interdisciplinary collaborations: a) Oregon State University/David Cann/Mechanical, Industrial, and Manufacturing Engineering project " High Temperature Piezoelectric Actuators"; b) Portland State University/Raul Cal/Mechanical,

Manufacturing, and Industrial Engineering; c) Portland State University/Sherry Cady/Geology project "Modern and Ancient Mars Analog Studies; Linking STEM Research, Training and Education"; d) Portland State University/Mark Weislogel/Mechanical and Materials Engineering project "Oregon Microgravity Drop Tower Research"; 2) Awarded one Faculty Research Award science-based project incorporating NASA's Education Priority of hands-on science inquiry experiences for students to a woman and/or underrepresented minority during the FY10-11 budget cycle; 3) Hosted the OSGC Student Symposium to highlight OSGC-supported student research opportunities. 21 students participated in a poster session and made project presentations to an audience of students, faculty, media, and general public with an approximate attendance of 45. Research Infrastructure accomplishments relate to NASA's Education Priorities and current areas of emphasis through hands-on student experiences in STEM disciplines, environmental science and global climate change research, diversity of institutions, faculty, and student participants, and support of innovative research infrastructure for early career faculty to focus on NASA priorities. (Outcome 1)

Higher Education: 1) Funded 2 pre-service STEM education students in collaboration with the Increasing Diversity in Earth Sciences (IDES) NSF program; 2) Supported the following three projects under the Undergraduate Research Program: a) PSU Microgravity Team; b) OSU Mars Rover Team; c) OSU Robotics Autonomous Aerial Team; 3) Provided support for LaunchGFU and LaunchOSU as part of the LaunchOregon High Altitude Balloon Program; 4) Sponsored Toby Dittrich of the Portland Community College Rock Creek Campus to attend the NSTA conference as part of continued support for the OSGC Course Development Program; 5) Supported 2 students to participate in 2011 NASA Academies or NASA Center student internships of which one was female/underrepresented. Additional students will be supported but have not accepted offers at the time of reporting and are therefore outside of the reporting cycle. Higher Education accomplishments relate to NASA's Education Priorities and current areas of emphasis by utilizing hands-on student experiences and engagement with community colleges, by promoting environmental science and global climate change research, and by supporting diversity of institutions, faculty, and student participants. (Outcome 1)

Pre-College Education: 1) Provided support for Jackson Middle School in collaboration with Portland State University to participate in the Student Spaceflight Experiments Program (SSEP) and the STS-134 Endeavour Launch; 2) Administered an Informal Education Award to The Museum at Warm Springs/Carol Leone/The Seeds of Discovery Program, a collaborative program between The Museum at Warm Springs tribal museum and the Jefferson County School District. Pre-College Education accomplishments relate to NASA's Education Priorities and current areas of emphasis through hands-on student experiences and engaging middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. (Outcome 2)

Public Outreach Programs: 1) Attended the Oregon Science Teachers Association Annual Conference and Expo to disseminate NASA material, resources, and professional development opportunities to approximately 250 pre-service and in-service educators; 2)

Disseminated NASA material, information, resources, and professional development opportunities via the OSGC website and educator blog; 3) Provided organizational and promotional support for NASA initiatives including NES and AESP. Public Outreach accomplishments relate to NASA's Education Priorities and current areas of emphasis by engaging middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. (Outcome 3)

Consortium Management: 1) Hosted annual affiliate meeting at The Museum at Warm Springs in Warm Springs, OR in September 2010 attended by OSGC affiliates, NASA initiative representatives, OSGC scholars, and OSGC administration; 2) Voted Peter Wu, affiliate representative at Southern Oregon University, to serve as OSGC Associate Director for a two-year term from September 2010 – September 2012 during which time he will attend at least one regional or national Space Grant Directors Meeting; 3) Attended Western Regional and Spring National Council of Space Grant Directors Meeting; 4) Disseminated NASA information and opportunities via the OSGC website and Educator Resource Blog; 5) Maintained the OSGC website and educator blog to be compliant with 508 accessibility codes 6) Completed NASA contract reporting in a timely manner; 7) Collected demographics and information of OSGC student awardees for longitudinal tracking.

Outcome 1 (employ and educate)

- 59 students significantly supported from FY10 funds
    - 21 in Fellowship & Scholarships
    - 38 in Higher Education/Research programs
- 14 students took next step in FY10 (SG participation supported from FY06-FY10 funds)
    - 12 are pursuing advanced degrees in STEM disciplines
    - 1 accepted a STEM position in K-12 academia
    - 1 went on to a position in a non-STEM discipline

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Student Data and Longitudinal Tracking: Total awards = 59; Fellowship/Scholarship = 21, Higher Education/Research Infrastructure = 38; 3 of the total awards represent underrepresented minority F/S funding. During the FY10 program year 12 are pursuing advanced degrees in STEM disciplines, one accepted a STEM position in K-12 academia, and one went on to a position in a non-STEM discipline.

  For all students who were significantly supported in the period spanning FY06-FY10, 30 are pursuing advanced degrees in STEM disciplines, 2 accepted positions with NASA contractors, 9 accepted STEM positions in industry, 2 accepted STEM positions in K-12 academia, 5 accepted STEM positions in academia, and 3 went on to positions in non-STEM disciplines. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award.

- Course Development: The following courses were developed at OSGC affiliate institutions that target the STEM skills needed by NASA and were developed with OSGC NASA support:

- Portland Community College – Rock Creek Campus (PCC) GCC1: Understanding Global Climate Change; GCC2: Adaptation and Mitigation; GCC3: Solutions and ACTION! are a series of online courses designed to promote awareness and understanding of global climate change issues.

- Matching Funds: The ratio of Oregon Space Grant Consortium funds leveraged by NASA funding support, excluding scholarship/fellowship funds, is 1.3-to-1 based on expenditure data.

- Minority-Serving Institutions: There are no minority-serving institutions within the state of Oregon.

IMPROVEMENTS MADE IN THE PAST YEAR

The Oregon Space Grant Consortium awarded fewer but more significant fellowship/scholarship awards and shifted focus to higher education and research projects that offer authentic, hands-on student/mentor opportunities in the STEM disciplines. OSGC encouraged greater community college involvement with programs and projects by cultivating collaborations with four-year institutions within the Consortium.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Higher Education Affiliate Institutions:

- Eastern Oregon University (EOU) - Focus on teacher education. Affiliate representative: Physics.
- George Fox University (GFU) - Focus on liberal arts and science education. Affiliate representative: Mathematics and Physics.
- Lane Community College (LCC) Aviation Academy - Offers Flight Technology and Aviation Maintenance Technology programs, a pilot certification program, and an Aviation Leadership concentration in collaboration with Oregon State University. Affiliate representative: Aviation.
- Oregon Institute of Technology (OIT) - Focus on technical and health related fields. Affiliate representative: Computer Systems Engineering.
- Oregon State University (OSU) - Lead Institution - Focus on engineering. Programs in nuclear engineering, ecology, biochemistry, oceanography, and pharmacy have been recognized nationally as top tier programs. Affiliate representative: Nuclear Engineering.
- Pacific University (PU) - Focus on math and science education. Affiliate representative: Science Education.
- Portland Community College Cascade Campus (PCC) - Focus on adult education. Affiliate representative: Portland Teachers Program (PTP)
- Portland Community College Rock Creek Campus (PCC) - Focus on adult education. Affiliate representative: Science and Technology.

- Portland Community College Sylvania Campus (PCC) - Affiliate representative: Physics.
- Portland State University (PSU) - Drop tower research and geophysics. Affiliate representative: Mechanical Engineering.
- Southern Oregon University (SOU) - Focus on liberal arts including criminology, natural sciences, and environmental science. Affiliate representative: Physics.
- University of Oregon (UO) - Manages the Pine Mountain Observatory in Bend OR. Affiliate representative: Physics.
- Western Oregon University (WOU) - Focus on science and math education. Affiliate representative: Physics.

Informal Education Affiliates:

- Evergreen Aviation & Space Museum - aviation and space museum, IMAX, and aviation education programs.
- Oregon Museum of Science and Industry (OMSI) - hands-on science museum and the Oregon NASA Education Resource Center.
- ScienceWorks Hands-On Museum - Science center with educational programs for both students and educators including workshops, lectures, and science camps.
- The Museum at Warm Springs - Tribal museum that partners with the local school district to offer hands-on science education utilizing expertise from within the community and around the state.